SECTION 07190--VAPOR BARRIERS

PART 1--GENERAL

SUMMARY:

Section Includes: Work includes, but is not limited to:

Furnish and install vapor barriers on all perimeter walls and roof of the administrative wing liquid storage area and treatment wing. The vapor barrier shall be located behind the gypsum board on the walls where gypsum board is installed and above the finished ceiling where gypsum board is not installed. The vapor barrier shall be continuous over all interior surfaces and all seams shall be sealed.

REFERENCES:

The following documents, including others referenced therein, form a part of this Section to the extent designated herein:

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 774	Standard Test Method for Bursting Strength of Paper
ASTM D 828	Standard Test Method for Tensile Properties of Paper and Paperboard Using Content-Rate of Elongation Apparatus
ASTM D 2020	Standard Test Method for Mildew (Fungus) Resistance of Paper and Paperboard
ASTM E 96	Standard Test Method for Water Vapor Transmission of Material

SUBMITTALS:

No submittals required unless and "or equal' item is submitted.

QUALITY CONTROL:

Regulatory Requirements (Codes and Standards): Comply with provisions of the following cades and standards, unless otherwise specified herein:

Surface Burning Characteristics of Materials

PART 2--PRODUCTS

MATERIALS:

Vapor Barrier: The vapor barrier shall be a fiberglass scrim reinforced white polypropylene backed by flame retardant Kraft paper. The vapor barrier shall be a 2805 PSK aluminum foil,

as manufactured by Lamotite, a Division of Rexham Corporation, or approved equal. A matching pressure sensitive tape shall be provided from the same company for sealing edges. The properties of the vapor barrier shall be as follows:

CONSTRUCTION

Aluminum Foil	0.0015 in.
Kraft	15 lb/ream _ 10%, White, Flame retardant
Adhesive	Flame retardant
Tri-directional fiberglass yarn reinforcing	Machine Direction (MD) 4 in. Cross Direction (XD) 4 in.

TYPICAL PHYSICAL PROPERTIES

Permeance (MVTR) ASTM E 96, Desiccant Method	
Perms, grains/hr-ft^2 in. Hg,	0.02
Puncture Resistance ASTM D 4833	10 minimum
Tensile Strength ASTM D 828 lb/in. Width, Avg.	40
Mullen Burst Strength ASTM D 774 P.S.I., Avg.	65
Mold and Mildew Resistance ASTM D 2020	
Mold Growth Sustenance	No growth or organisms
Humidity Resistance 30 days at 95% RH/120° F	
Corrosion or Delamination 10 minimum	None
Dimensional Stability 15 min at 200° F Percent Length Change, Max	0.25
Low Temperature Resistance 4 hr at 30° F	Remains flexible with no delamination
High Temperature Resistance 24 hr at 150° F	Remains flexible with no delamination

Weight per MSF, lb + or - 5% 21

Underwriters' Laboratories Surface Burning Characteristics Classification:

Kraft Exposed	Facing Foil Exposed
20	5
35	5

PART 3--EXECUTION

INSTALLATION:

Seal the vapor barrier at seams, perimeter, obstructions and penetrations, with tape recommended by manufacturer. Wall vapor barrier shall be installed as described in description of work.

The roof vapor barrier shall be installed over the top of the purlins and down under the batt insulation, continuously over the entire roof surface. Adequate slack shall be provided to allow the batt insulation to completely fill the void between the roof purlins. No penetrations for structural struts or other materials except when sealed with tape will be allowed.

FIELD QUALITY CONTROL:

Surveillance will be performed by the Contractor's Representative to verify compliance of the work to the drawings and specifications.

END OF SECTION 07190

SECTION 07200--THERMAL INSULATION

PART 1--GENERAL

SUMMARY:

Extent of insulation work is shown on drawings, by note and/or symbol. All exterior walls and roofs of heated areas shall be insulated whether specifically shown or not.

Section Includes: Work includes, but is not limited to:

- Furnish and install foundation wall insulation.
- Furnish and install (20% recycled) blanket-type building insulation.
- Furnish and install rigid wall insulation.
- Furnish and install support system for roof insulation.

REFERENCES:

The following documents, including others referenced therein, form a part of this Section to the extent designated herein:

[ADD OR DELETE AS NECESSARY]

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 612	Standard Specification for Mineral Fiber Block and Board Insulation
ASTM C 553	Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications
ASTM C 665	Mineral Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing
ASTM E 84	Standard Test method for Surface Burning Characteristics of Building Materials

SUBMITTALS:

Submittals include, but are not limited to the following:

Product Data: Submit product data indicating compliance with the requirements of this Section.

See Section 01300, Submittals and Vendor Data Schedule for additional submittal requirements.

QUALITY CONTROL:

Regulatory Requirements (Codes and Standards): Comply with provisions of the following codes and standards, unless otherwise specified herein:

[ADD OR DELETE AS NECESSARY]

ASTM [C 553, C 612, C665]

Thermal Conductivity: Thickness' shown are for thermal conductivity specified for each material. Provide adjusted thickness as directed for equivalent use of material having a different thermal conductivity. Where insulation is identified by "R" value, provide appropriate thickness.

DELIVERY, STORAGE AND HANDLING:

General Protection: Do not allow insulation materials to become wet, soiled, or covered with ice or snow. Comply with manufacturer's recommendations for handling, storage and protection during installation.

PART 2--PRODUCTS

MATERIALS:

Below Grade Insulation: Provide "Styrofoam SM" by Dow Chemical U.S.A., or "Foamular" by U.C. Industries.

Adhesive: Provide adhesive recommended by insulation manufacturer.

**[THE FOLLOWING IS FOR LIGHT FRAME WALLS
TYPE I W/O MEMBRANE COVERING
TYPE II WITH MEMBRANE ON ONE FACE]**

Mineral/Glass Fiber Blanket/Batt Insulation: Inorganic fibers formed into flexible resilient blankets or semirigid resilient sheets complying with ASTM C 665, [Type I][Type II, Class A] ; density as indicated, but 1.0 lb minimum; k-value of 0.27; manufacturer's standard lengths and widths as required to coordinate with spaces to be insulated; types as follows; Batts shall have rating shown on drawings or specified herein.

**[THE FOLLOWING IS FOR COMMERCIAL/INDUSTRIAL USE
SEE THE ASTM SPEC FOR TYPES]**

Mineral/Glass Fiber Blanket/Batt Insulation: Inorganic fibers formed into flexible resilient blankets or semirigid resilient sheets complying with ASTM C 553; density as indicated, but

1.0 lb minimum; k-value of 0.27; manufacturer's standard lengths and widths as required to coordinate with spaces to be insulated; types as follows; Batts shall have rating shown on drawings or specified herein.

Thickness:

Walls	3 1/2 in.	R-11 friction fit (in perimeter metal wall panels)
Roof	9 in.	R-26 vapor barrier faced 6 in. layer and (1) unfaced 3 in. layer.
Foundation wall	2 in.	R-10 extruded polystyrene rigid board insulation.

Roof Insulation Vapor Barrier: The roof insulation batts shall be provided with an attached (laminated) vapor barrier designed to be used in the roof of a pre-engineered metal building. The vapor barrier material shall be Lamotite 2805, by Rexam Corporation or approved equal white metalized polypropylene/scrim/ kraft. It shall have been tested by Underwriter's Laboratories and shall possess ratings as follows:

	Flame Spread	Smoke Developed
Kraft side exposed	10	30
Polypropylene side exposed	5	25

In all cases the vapor barrier shall be attached to the batt insulation so that when it is installed, the polypropylene side is exposed to the interior. Width of the vapor barrier shall be such that it can be overlapped on the tops of the roof purlins to form a continuous roof vapor barrier.

Roof Insulation Support System: The Roof Insulation Support System shall be "Insul Basket" as manufactured by IB, Inc., P.O. Box 9807, Madison, WI 53715, Telephone 608-257-7288, or approved equal. Units shall be designed for use with "Z" shaped roof purlins. All Insul Basket members shall be painted white. The Insul Basket shall be 8 in. deep and allow 9 in. of insulation to be installed below the metal standing seam roof with slight compression of the batts.

Rigid Wall Insulation: The rigid wall insulation shall be Thermax as manufactured by Celotex in 4 X 8 ft sheets with foil facing on both sides. The insulation shall be 1.25 in. thick with an R value of 9.00. Surface burning characteristics shall be as follows: Flame spread 25 or less and smoke developed 100 or less as tested according to ASTM E 84.

PART 3--EXECUTION

INSTALLATION:

General: Comply with manufacturer's instructions for particular conditions of installation in each case. If printed instructions are not available or do not apply to project conditions, consult manufacturer's technical representative for specific recommendations before proceeding with work.

Extend insulation full thickness as shown over entire area to be insulated. Cut and fit tightly around obstructions, and fill voids with insulation. Remove projections which interfere with placement.

Perimeter Foundation Insulation: On vertical surfaces, set units in adhesive applied in accordance with manufacturer's instructions. Apply with the long dimension vertical. Use adhesive type recommended by manufacturer of insulation.

FIELD QUALITY CONTROL:

Surveillance will be performed by the Contractor's Representative to verify compliance of the work to the drawings and specifications.

END OF SECTION 07200

SECTION 07270--FIRESTOP MATERIAL

PART 1--GENERAL

SUMMARY:

Section Includes: Work includes, but is not limited to:

Seal penetrations through fire-resistance-rated floor and roof construction including both empty openings and openings containing cables, pipes, ducts, conduits, and other penetrating items.

Seal penetrations through fire-resistance-rated walls and partitions including both empty openings and openings containing cables, pipes, ducts, conduits, and other penetrating items.

Seal penetrations through smoke barriers and construction enclosing compartmentalized areas involving both empty openings and openings containing penetrating items.

Seal joints in fire-resistance-rated construction.

REFERENCES:

The following documents, including others referenced therein, form part of this Section to the extent designated herein:

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 719	Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclical Movement
ASTM C 920	Specification for Elastomeric Joint Sealants
ASTM C 1193	Guide for use of Joint Sealants
ASTM E 84	Test Method for Surface Burning Characteristics of Building Materials
ASTM E 119	Test Methods for Fire Tests of Building Construction and Materials
ASTM E 136	Test Method for Behavior of Material in a Vertical Tube Furnace at 750° C.
ASTM E 814	Test Method for of Through-Penetration Fire Stops

UNDERWRITERS' LABORATORIES, INC. (UL)

UL	Fire Resistance Directory, Volume II
UL	Building Materials Directory

SUBMITTALS:

No submittals are required unless an "or equal" item is submitted.

DELIVERY, STORAGE, AND HANDLING:

Deliver firestopping products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer; date of manufacture; lot number; shelf life, if applicable; qualified testing and inspecting agency's classification marking applicable to Project; curing time; and mixing instructions for multicomponent materials.

Store and handle firestopping materials to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

PART 2--PRODUCTS

Firestop Material: Firestop material shall be a caulk, putty, foam material or intumescent bags UL listed for a fire protection rating equal to the fire rating of the construction penetrated.

Acceptable products include, but are not limited to:

Dow Corning Firestop System.
BIO Fireshield, Inc., Products.
Flame Safe FS and FST900 Series.
General Electric Co., Silicones.
Nelson Firestop Systems.
Sika Corporation Systems.
Fiberfrax Fyre Putty.
United States Gypsum Co., Products.
Hilti/Ciba-Geigy high performance firestop sealant system and CB 120 foam for openings greater than 1/2 in. and CS240 elastomeric sealant for small cracks and joints.
Sonneborne Building Products Division Product.
Interam Fire Protection Products.
Mameco International, Inc., Products.
KBS (intumescent) Sealbags.

Or any manufacturer listed in the UL Fire Resistance Directory for through-penetration Firestop Systems.

The product shall be installed per the UL Building Materials Directory System No. for which the product has been tested.

PART 3--EXECUTION

The firestop material shall be applied in strict accordance with the manufacturer's directions for the rating indicated on the drawings and inspected by the Contractor's Representative for compliance. All applications shall be trimmed or trowelled for a smooth finish and neat joint. Drips or runs along surfaces shall be removed and surface cleaned or painted.

FIELD QUALITY CONTROL:

Surveillance will be performed by the Contractor's Representative to verify compliance of the work to the drawings and specifications.

END OF SECTION 07270

SECTION 07901--JOINT SEALANTS

PART 1--GENERAL

SUMMARY:

Section Includes: Work includes, but is not limited to:

Seal exterior joints in vertical surfaces; and non traffic horizontal surfaces as indicated below:

- Perimeter joints between building materials and frames of doors and windows.
- Control and expansion joints in ceiling and overhead surfaces.
- Other joints as indicated.

Seal exterior joints in horizontal traffic surfaces as indicated below:

- Control, expansion, and isolation joints in cast-in-place concrete slabs.
- Joints between different materials.
- Other joints as indicated.

Seal interior joints in vertical surfaces and horizontal nontraffic surfaces as indicated below:

- Control and expansion joints on exposed interior surfaces of exterior walls.
- Perimeter joints of exterior openings where indicated.
- Perimeter joints between interior wall surfaces and frames of interior doors and windows.
- Perimeter joints of toilet fixtures.
- Other joints as indicated.

Seal interior joints in horizontal traffic surfaces as indicated below:

- Control and expansion joints in cast-in-place concrete slabs.
- Control and expansion joints in tile flooring.
- Other joints as indicated.

Related Sections: The following Sections contain requirements that relate to this Section:

- Section 08800, Glass and Glazing for sealants used in glazing.
- Section 09250, Gypsum Drywall for sealing concealed perimeter joints of gypsum board partitions to reduce sound transmission.
- Section 09510, Acoustical Panels for sealing edge moldings at perimeter of acoustical ceilings.

SYSTEM DESCRIPTION:

Joint Sealants: Provide elastomeric joint sealants that have been produced and installed to establish and to maintain watertight and airtight continuous seals without causing staining or deterioration of joint substrates.

REFERENCES:

The following documents, including others referenced therein, form part of this Section to the extent designated herein:

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 719	Standard Test Method for Adhesion and Cohesion of Elastormeric Joint Sealant Under Cyclic Movement (Hockman Cycle)
ASTM C 834	Standard Specification for Latex Sealants
ASTM C 920	Standard Specification for Elastomeric Joint Sealants
ASTM C 1193	Standard Guide for Use of Joint Sealants
ASTM D 1056	Standard Specification for Flexible Cellular Materials - Sponge or Expanded Rubber
ASTM E 90	Standard Test Method for Laboratory Measurements of Airborne Sound Transmission Loss of Building Partitions and Elements

SUBMITTALS:

Submittals include, but are not limited to the following:

Product Data: Submit product data from manufacturers for each joint sealant product required:

Certification: Submit certification by joint sealant manufacturer that sealants plus the primers and cleaners required for sealant installation comply with local regulations controlling use of volatile organic compounds.

Samples: Submit samples for initial selection proposed in form of manufacturer's standard bead samples, consisting of strips of actual products showing full range of colors available, for each product exposed to view.

See Section 01300, Submittals and the Vendor Data Schedule for additional submittal requirements.

QUALITY CONTROL:

Installer Qualifications: Engage an experienced Installer who has completed joint sealant applications similar in material, design, and extent to that indicated for the Project that have resulted in construction with a record of successful in-service performance.

Single Source Responsibility for Joint Sealant Materials: Obtain joint sealant materials from a single manufacturer for each different product required.

DELIVERY, STORAGE, AND HANDLING:

Deliver Materials: Deliver materials to the Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions for multicomponent materials.

Store and Handle Materials: Store and handle materials in compliance with manufacturer's recommendations to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

SITE CONDITIONS:

Environmental Conditions: Do not proceed with installation of joint sealants under the following conditions:

When ambient and substrate temperature conditions are outside the limits permitted by joint sealant manufacturer or below 40° F (4.4° C).

When joint substrates are wet.

Joint Width Conditions: Do not proceed with installation of joint sealants where joint widths are less than allowed by joint sealant manufacturer for application indicated.

Joint Substrate Conditions: Do not proceed with installation of joint sealants until contaminants capable of interfering with their adhesion are removed from joint substrates.

PART 2--PRODUCTS

MATERIALS, GENERAL:

Compatibility: Provide joint sealants, joint fillers, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.

Colors: Provide selections made by Architect from manufacturer's full range of standard colors for products of type indicated.

ELASTOMERIC JOINT SEALANTS:

Elastomeric Sealant Standard: Provide manufacturer's standard chemically curing elastomeric sealants that comply with ASTM C 920 and other requirements indicated on each Elastomeric Joint Sealant Data Sheet at end of this Section, including those requirements referencing ASTM C 920 classifications for Type, Grade, Class, and Uses.

Additional Movement Capability: Where additional movement capability is specified in Elastomeric Joint Sealant Data Sheet, provide products with the capability, when tested for adhesion and cohesion under maximum cyclic movement per ASTM C 719, to withstand the specified percentage change in the joint width existing at time of installation and remain in compliance with other requirements of ASTM C 920 for Uses indicated.

Available Products: Subject to compliance with requirements, elastomeric sealants that may be incorporated in the Work include, but are not limited to, the products specified in each Elastomeric Sealant Data Sheet.

ACOUSTICAL JOINT SEALANTS:

Acoustical Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834 and the following requirements:

Product is effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies per ASTM E 90.

Product has flame spread and smoke developed ratings of less than 25 per ASTM E 84.

Acoustical Sealant for Concealed Joints: Manufacturer's standard, nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic rubber sealant recommended for sealing interior concealed joints to reduce transmission of airborne sound.

Available Products: Subject to compliance with requirements, acoustical joint sealants that may be incorporated in the Work include, but are not limited to, the following:

Acoustical Sealant:
USG, Sheetrock Acoustical Sealant
Pecora Corp., AC-20 FTR Acoustical and Insulation Sealant

Acoustical Sealant for Concealed Joints:
Pecora Corp., BA-98
Tremco, Inc., Tremco Acoustical Sealant

TAPE SEALANTS:

Tape Sealant: Manufacturer's standard, solvent-free, butyl-based tape sealant with a solids content of 100% formulated to be nonstaining, paintable, and nonmigrating in contact with nonporous surfaces with or without reinforcement thread to prevent stretch and packaged on rolls with a release paper on one side.

Available Products: Subject to compliance with requirements, tape sealants that may be incorporated in the Work include, but are not limited to, the following:

Pecora Corp., Extru-Seal Tape
Pecora Corp., Shim-Seal Tape
Protective Treatments, Inc., PTI 606
Tremco, Inc., Tremco 440 Tape
Tremco, Inc., MBT-35

JOINT SEALANT BACKING:

General: Provide sealant backings of material and type that are compatible with joint substrates, sealants, primers and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

Plastic Foam Joint Filler: Preformed, compressible, resilient, nonstaining, nonwaxing, nonextruding strips of flexible plastic foam of material indicated below and of size, shape, and density to control sealant depth and otherwise contribute to producing optimum sealant performance:

Closed-cell polyethylene foam, nonabsorbent to liquid water and gas, nonoutgassing in unruptured state.

Elastomeric Tubing Joint fillers: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D 1056, nonabsorbent to water and gas, capable of remaining resilient at temperatures down to -26° F (-32° F). Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and otherwise contribute to optimum sealant performance.

Bond-Breaker Tape: Polyethylene tape or other plastic tape as recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

MISCELLANEOUS MATERIALS:

Primer: Material recommended by joint sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint sealant-substrate tests and field tests.

Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming in any way joint substrates and adjacent nonporous surfaces, and formulated to promote optimum adhesion of sealants with joint substrates.

Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3--EXECUTION

EXAMINATION:

Examining joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint sealant performance. Do not proceed with installation of joint sealants until unsatisfactory conditions have been corrected.

PREPARATION:

Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with recommendations of joint sealant manufacturer and the following requirements:

Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.

Clean concrete, masonry, unglazed surfaces of ceramic tile, and similar porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air.

Remove laitance and form release agents from concrete.

Clean metal, glass, porcelain enamel, glazed surfaces of ceramic tile, and other nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.

Joint Priming: Prime joint substrates where indicated or where recommended by joint sealant manufacturer based on preconstruction joint sealant-substrate tests or prior experience. Apply primer to comply with joint sealant manufacturer's recommendations. Confine

primers to areas of joint sealant bond; do not allow spillage or migration onto adjoining surfaces.

Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

INSTALLATION OF JOINT SEALANTS:

General: Comply with joint sealant manufacturer's printed installation instructions applicable to products and applications indicated, except where more stringent requirements apply.

Sealant Installation Standard: Comply with recommendations of ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

Acoustical Sealant Application Standard: Comply with recommendations of ASTM C 919 for use of joint sealants in acoustical applications as applicable to materials, applications, and conditions indicated.

Installation of Sealant Backings: Install sealant backings to comply with the following requirements:

Install joint fillers of type indicated to provide support of sealants during application and at position required to produce the cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

Do not leave gaps between ends of joint fillers. Do not stretch, twist, puncture, or tear joint fillers. Remove absorbent joint fillers that have become wet prior to sealant application and replace with dry material.

Install bond breaker tape between sealants where backer rods are not used between sealants and joint fillers or back of joints.

Installation of Sealants: Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability. Install sealants at the same time sealant backings are installed.

Tooling of Nonsag Sealants: Immediately after sealant application and prior to time skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated, to eliminate air pockets, and to ensure contact and adhesion of sealant with sides of joint. Remove excess sealants from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.

Installation of Preformed Foam Sealants: Install each length of sealant immediately after removing protective wrapping, taking care not to pull or stretch material, and to comply with sealant manufacturer's directions for installation methods, materials, and tools that produce seal continuity at ends, turns, and intersections of joints. For applications at low ambient temperatures where expansion of sealant requires acceleration to produce seal, apply heat to sealant in conformance with sealant manufacturer's recommendations.

PROTECTION:

Protect joint sealants during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so that installations with repaired areas are indistinguishable from original work.

FIELD QUALITY CONTROL:

Surveillance will be performed by the Contractor's Representative to verify compliance of the work to the drawings and specifications.

CLEANING:

Clean off excess sealants or sealant smears adjacent to joints as work progresses by methods and with cleaning materials approved by manufacturers of joint sealants and of products in which joints occur.

ELASTOMERIC JOINT SEALANT DATA SHEET NO. 1

Elastomeric Joint Sealant Designation: ES-1.
Base Polymer: Oligomeric Polyurethane.
Type: Multicomponent.
Grade: Non sag.
Class: 25.
Additional Movement Capability: 50% in either extension or compression.
Use Related to Exposure: Non traffic.
Uses Related to Joint Substrates: Excellent adhesion to most common building substrates. Primer required on some Architectural finishes.
Colors Available: 50 standard colors.
Available Products: DYMERIC 511 as manufactured by TREMCO or approved equal.

ELASTOMERIC JOINT SEALANT DATA Sheet NO. 2

Elastomeric Joint Sealant Designation: ES-2.
Base Polymer: Silicone.
Type: One part.
Grade: Non sag.
Class: 25.
Additional Movement Capability: 100% extension, 50% compression.
Use Related to Exposure: Non traffic.
Uses Related to Joint Substrates: Aluminum, glass, and concrete. Some materials with special surface characteristics, finishes, or coatings may require priming.
Colors Available: 6 colors, precast white, off white, limestone, bronze, aluminum/stone, black.
Available Products: Spectrum 1 as manufactured by TREMCO or approved equal.

END OF SECTION 07901

SECTION 08110--STEEL DOORS AND FRAMES

PART 1--GENERAL

SUMMARY:

Section Includes: Work includes, but is not limited to:

Furnish and install steel personnel door and frames.

Related Sections: The following sections contain requirements that relate to the work of this section:

Section 08210, Flush Wood Doors for wood doors installed in metal frames.
Section 08700, Door Hardware for door hardware and weather stripping.
Section 08800, Glass and Glazing for glass in steel doors.
Section 09900, Painting for field painting primed doors and frames.

REFERENCES:

The following documents, including others referenced therein, form part of this Section to the extent designated herein:

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI A115	Hardware Standards Series
ANSI A224.1	Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames
ANSI A250.4	Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors and Hardware Reinforcement

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 153	Zinc Coating on Iron and Steel Hardware
ASTM A 366	Steel, Carbon, Cold-Rolled, Commercial Quality
ASTM A 569	Steel, Carbon, hot-Rolled Sheet and Strip Commercial Quality
ASTM A 620	Steel Sheet, Carbon, Drawing Quality, Special Killed, Hot-Rolled
ASTM A 653	Steel Sheet, Zinc-Coated or Zinc-Iron Alloy-coated by the hot-Dip Process
ASTM A 780	Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
ASTM C 236	Steady State Thermal performance of Building Assemblies by means of a Guarded Hot Box
ASTM C 976	Thermal Performance of Building Assemblies by Means of a Calibrated Hot Box

ASTM E 152 Fire Test of Door Assemblies

DOOR AND HARDWARE INSTITUTE

Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 80 Fire Doors and Fire Windows

STEEL DOOR INSTITUTE (SDI)

SDI 100 Recommended Specifications for Standard Steel Doors and Frames
SDI 105 Recommended Erection instructions for Steel Frames
SDI 107 Hardware on Steel Doors
SDI 112 Galvanized Standard Steel Doors and Frames
SDI 117 Manufacturing Tolerances Standard Steel Doors and Frames

STEEL STRUCTURES PAINTING COUNCIL (SSPC)

SSPC-PA 1 Paint Application Specification No. 1
SSPC-Paint 20 Zinc-Rich Primers
SSPC-SP 1 Solvent Cleaning
SSPC-SP 5 White Metal Blast Cleaning
SSPC-SP 8 Pickling

UNDERWRITER'S LABORATORIES (UL)

FACTORY MUTUAL (FM)

SUBMITTALS:

Submittals include, but are not limited to the following:

[DELETE ANY ITEMS FROM THE FOLLOWING THAT ARE NOT NEEDED]

Product Data: Submit product data for each type of door and frame specified, including details of construction, materials, dimensions, hardware preparation, core, label compliance, sound ratings, profiles, and finishes.

Shop Drawings: Submit shop drawings showing fabrication and installation of door and frames. Include details of each frame type, elevation of door design types, conditions of openings, details of construction, location and installation requirements of door and frame hardware and reinforcements, and details of joints and connections. Show anchorage and accessory items.

Door Schedule: Submit schedule of doors and frames using same reference numbers for door details and openings as those on subcontract drawings. Indicate coordination of glazing frames and stops with glass and glazing requirements.

Samples for Initial Selection: Submit manufacturer's color charts showing full range of colors available for factory-finished doors and frames.

Samples for Verification: Submit samples for each type of exposed finish required, prepared on samples not less than 3 by 5 inches of same thickness and material indicated for final unit of work.

Oversized Door Certificate: Submit certification from UL or FM for fire-rated door assemblies exceeding limitations of labeled assemblies that each oversize door and frame assembly conforms to design, materials, and construction equivalent to requirements of labeled construction.

See Section 01300, Submittals and the Vendor Data Schedule for additional submittal requirements.

QUALITY CONTROL:

Regulatory Requirements (Codes and Standards): Comply with the provisions of the following codes and standards, unless otherwise specified:

ANSI/SDI 100

DELIVERY, STORAGE AND HANDLING:

Deliver doors and frames cardboard-wrapped or crated to provide protection during transit and job storage. Provide additional protection for factory finished doors.

Inspect doors and frames upon delivery for damage. Minor damages may be repaired provided finished items are equal in all respects to new work and acceptable to the Contractor; otherwise, remove and replace damaged items as directed.

Store doors and frames under cover, placed on minimum 4 inch high wood blocking. Avoid creating non-vented humidity shelters. If cardboard wrappers become wet, remove cartons immediately. Provide minimum 1/4 inch spaces between stacked doors.

PART 2--PRODUCTS

MANUFACTURERS:

Available manufacturers of steel doors include the following:

AMWELD Building Products Div.
Ceco Corp.
Curries
Fenestra
Republic Builders Products Corp.
Steelcraft Mfg. Co.

Available manufacturers of steel fire doors include the following:

AMWELD Building Products Div.
Ceco Corp.
Curries
Fenestra
Republic Builders Products Corp.
Steelcraft Mfg. Co.

MATERIALS:

Hot-Rolled Steel Sheets and Strip: Commercial quality carbon steel, pickled and oiled, complying with ASTM A 569.

Cold-Rolled Steel Sheets: Commercial quality carbon steel, complying with ASTM A 366, or ASTM A 620, drawing quality, special killed.

Galvanized Steel Sheets: Zinc-coated carbon steel sheets complying with ASTM A 653 commercial quality, with A60 or G60 coating designation, mill phosphatized.

Supports and Anchors: Fabricate of not less than 18 gage galvanized sheet steel.

Inserts, Bolts and Fasteners: Manufacturer's standard units, except hot-dip galvanized items to be built into exterior walls complying with ASTM A 153, Class C or D as applicable.

DOORS:

Steel Doors: 1-3/4" doors, conforming to ANSI/SDI 100, with manufacturer's standard core, except provide cores in exterior doors with rigid polyutherane cores. Provide exterior doors with top and bottom edges finished flush. Provide doors of materials and ANSI/SDI 100 grades and models specified below, or as indicated on drawings and schedules.
Interior Doors: Unless otherwise indicated, Grade II, heavy duty, Model 2 (seamless design), 18 gauge cold-rolled steel sheet faces.

Interior Closet & Storage Doors: Grade II, heavy duty, Model 1 or 2 (full flush or seamless design), minimum 18 gauge cold-rolled steel sheet faces.

Interior Mechanical Room, Toilet and Janitor Closet Doors: Grade II, heavy duty, Model 1 or 2 (full flush or seamless design), minimum 18 gauge galvanized steel sheet faces.

Interior and Exterior Vestibule and Stairwell Doors: Grade III, extra heavy duty, Model 2 (seamless design), minimum 16 gauge galvanized steel sheet faces.

Exterior Doors: Unless otherwise indicated, Grade III, extra heavy duty, Model 2 (seamless) design), minimum 16 gauge galvanized steel sheet faces.

Exterior Full Glass Entrances: Grade III, extra heavy duty, Model 3 (stile and rail design), minimum 16 gauge galvanized steel sheet faces.

Glazing: See Section 08800, Glass and Glazing of these specifications.

Hardware: See Section 08700, Door Hardware of these specifications.

FRAMES:

Provide metal frames for doors and other openings according to ANSI/SDI 100 and of types and styles as shown on drawings and schedules. Conceal fastenings unless otherwise indicated. Frames shall be No. 16 USS gage or heavier cold-rolled steel sheet. Form exterior frames of hot dip galvanized steel. Fabricate frames with mitered and welded corners.

Door Silencers: Except on weather-stripped and fire rated frames, drill stops to receive three silencers on strike jambs of single-swing frames and two silencers on heads of double-swing frames.

FIRE DOORS:

General: All fire doors and frames shall be UL or FM approved and labeled accordingly and shall be for Class_____ openings.

Fire-Rated Assemblies: Units complying with NFPA 80 identical to assemblies tested for fire-test-response characteristics per ASTM E152, and labeled or listed by UL or FM. For oversized fire-rated assemblies, provide certification from UL or FM that doors conform to standard requirements of tested and labeled assemblies except for size.

FABRICATION:

Comply with ANSI/SDI 100 requirements. Fabricate with clearances not more than 1/8 inch at head and jambs, 1/4 inch at non-fire-rated, pair door meeting stiles, and not more than 3/4 inch at bottom. Comply with NFPA 80 per fire door clearances. Fabricate exterior steel doors and frames according to SDI 112.

Tolerances: Comply with SDI 117 requirements.

Thermal-Rated (Insulating) Assemblies: At all exterior locations, provide doors which have been fabricated as thermal insulating door and frame assemblies and tested in accordance with ASTM C 236 or ASTM C 976. Unless otherwise indicated, provide assemblies with maximum apparent U factor for thermal-rated assemblies is 0.24 BTU/hr (ft^2) ° F.

Fire-Rated Assemblies: Fabricate fire-rated assemblies to comply with NFPA 80. Identify each fire door and frame with UL or FM testing laboratory labels indicating fire-rating.

Finish Hardware Preparation: Prepare doors and frames to receive mortised and concealed finish hardware in accordance with final Finish Hardware Schedule and templates provided by hardware supplier. Comply with applicable requirements of SDI 107 and ANSI A115 series specifications for door and frame preparation for hardware.

Locate finish hardware as shown on final shop drawings or, if not shown, in accordance with DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."

GALVANIZED STEEL SHEET FINISHES:

Surface Preparation: After fabrication, clean surfaces with nonpetroleum solvent so that surfaces are free of oil, or other contaminants. After cleaning, apply a conversion coating of type suited to the organic coating applied over it. Clean welds, mechanical connections and abraded areas, and apply galvanizing repair paint specified below to comply with ASTM A 780.

Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in galvanized steel, with dry film containing not less 94 percent zinc dust by weight, and complying with SSPC-Paint 20.

Factory Priming for Field Painting: Where field painting after installation is indicated apply air-dried shop primer that is compatible with finish paint system indicated. Apply primer immediately after cleaning and pretreatment.

STEEL SHEET FINISHES:

Surface Preparation: After fabrication, solvent-clean surfaces in compliance with SSPC-SP 1 to remove dirt, oil, grease and other contaminants that could impair paint bond. Remove mill scale and rust, if present, to comply with SSPC-SP 5 (white metal blasting cleaning), or SSPC-SP 8 (pickling).

Pretreatment: Immediately after surface preparation, apply a conversion coating of a type suited to the organic coating applied over it.

Factory Priming for Field Painting: Apply shop primer that complies with ANSI A224.1 acceptance criteria, is compatible with finish paint system indicated, and has capability to provide a sound foundation for field-applied topcoats. Apply primer immediately after surface preparation and pretreatment.

PART 3--EXECUTION

EXAMINATION:

Installer must examine substrate and conditions under which steel doors and frames are to be installed and must notify Subcontractor of any conditions detrimental to proper and timely completion of work. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to Installer. Subcontractor shall be responsible for field verification of dimensions.

INSTALLATION:

General: Install steel doors, frames, and accessories according to Shop Drawings, manufacturer's data, and as specified.

Placing Frames: Comply with provisions of SDI 105, unless otherwise indicated. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders, leaving surfaces smooth and undamaged.

Except for frames located in existing concrete, masonry, or gypsum board assembly construction, place frames before constructing enclosing walls and ceilings.

[EDIT BELOW TO SUIT PROJECT]

At Existing Concrete or Masonry Construction: Install at least 3 completed opening anchors per jamb adjacent to hinge location on hinge jamb and at corresponding heights on strike jamb. Set frames and secure to adjacent construction with bolts and masonry anchorage devices.
In Metal-Stud Partitions: Install at least 3 wall anchors per jamb at hinge and strike levels. In steel-stud partitions, attach wall anchors to studs with screws.

In-Place Gypsum Board Partitions: Install knock-down, slip-on, drywall frames.

Fire-Rated Frames: Install according to NFPA 80.

Door Installation: Fit hollow metal doors accurately in frames, within clearance specified in SDI-100.

Fire-rated doors: Install with clearances specified in NFPA 80.

FIELD QUALITY CONTROL:

Surveillance will be performed by the Contractor's Representative to verify compliance of the work to the drawings and specifications.

ADJUSTING AND TOUCH UP:

Prime Coat Touch up: Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touch up of compatible air-drying primer.

Protection Removal: Immediately prior to final inspection, remove protective plastic wrappings from prefinished doors.

Final Adjustments: Check and readjust operating finish hardware items, leaving steel doors and frames undamaged and in complete and proper operating condition.

CLEANING:

Clean off excess sealants or sealant smears adjacent to joints as work progresses by methods and with cleaning materials approved by manufacturers of joint sealants and of products in which joints occur.

END OF SECTION 08110